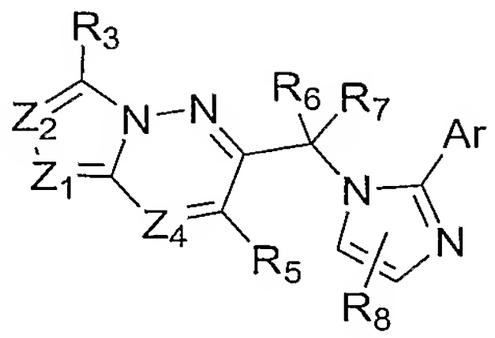
What is claimed is:

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein:

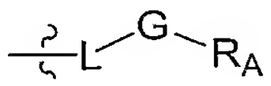
Z_1 is nitrogen or CR_1 and Z_2 is nitrogen or CR_2; such that at least one of Z_1 and Z_2 is nitrogen;

Z_4 is nitrogen or CR_4;

R_1, R_2, R_3 and R_4 are each independently selected from:

(a) hydrogen, halogen, nitro and cyano; and

(b) groups of the formula:



wherein:

L is a single covalent bond or C_1-C_8alkylene;

G is a single covalent bond, $N(R_B)$, O, C(=O), C(=O)O, $C(=O)N(R_B)$, $N(R_B)C(=O)$, $S(O)_m$, $CH_2C(=O)$, $S(O)_mN(R_B)$ or $N(R_B)S(O)_m$; wherein m is 0, 1 or 2; and

R_A and each R_B are independently selected from:

(i) hydrogen; and

(ii) C_1-C_8alkyl, C_2-C_8alkenyl, C_2-C_8alkynyl, (C_3-C_8cycloalkyl)C_0-C_4alkyl, (3- to 6-membered heterocycloalkyl)C_0-C_4alkyl, (aryl)C_0-C_2alkyl and (heteroaryl)C_0-C_2alkyl, each of which is substituted with from 0 to 4 substituents independently selected from halogen, hydroxy, nitro, cyano, amino, C_1-C_4alkyl, C_1-C_4alkoxy, C_1-C_4alkanoyl, mono- and di(C_1-C_4alkyl)amino, C_1-C_4haloalkyl and C_1-C_4haloalkoxy;

R_5 is hydrogen, halogen, cyano, C_1-C_6alkyl, C_2-C_6alkenyl, C_2-C_6alkynyl, C_1-C_4alkoxy, or mono- or di-(C_1-C_4alkyl)amino, each of which is substituted with from 0 to 5 substituents independently chosen from halogen, hydroxy, nitro, cyano, amino, C_1-C_4alkoxy, C_1-C_2haloalkyl, C_1-C_2haloalkoxy, mono- and di-C_1-C_4alkylamino, C_3-C_8cycloalkyl, phenyl, phenylC_1-C_4alkoxy and 5- or 6-membered heteroaryl;

R_6 and R_7 are independently hydrogen, methyl, ethyl or halogen;

R_8 represents 0, 1 or 2 substituents independently chosen from halogen, hydroxy, nitro, cyano, amino, C_1-C_4alkyl, C_1-C_4alkoxy, mono- and di(C_1-C_4alkyl)amino, C_3-C_7cycloalkyl, C_1-C_2haloalkyl and C_1-C_2haloalkoxy; and

Ar represents phenyl, naphthyl or a 5- to 10-membered heteroaryl, each of which is substituted with from 0 to 4 substituents independently chosen from halogen, hydroxy, nitro, cyano, amino, C_1-C_8alkyl, C_1-C_8alkenyl, C_1-C_8alkynyl, C_1-C_8alkoxy, (C_3-C_7cycloalkyl)C_0-C_4alkyl, (C_3-C_7cycloalkyl)C_1-C_4alkoxy, C_2-C_8alkyl ether, C_3-C_8alkanone, C_1-C_8alkanoyl, 3- to 7-membered heterocycloalkyl, C_1-C_8haloalkyl, C_1-C_8haloalkoxy, oxo, C_1-C_8hydroxyalkyl, C_1-C_8aminoalkyl, and mono- and di-(C_1-C_8alkyl)aminoC_0-C_8alkyl.

2. A compound or salt according to claim 1, wherein R_8 represents 0 or 1 substituent selected from halogen, C_1-C_2alkyl and C_1-C_2alkoxy.

3. A compound or salt according to claim 1 or claim 2, wherein Ar is substituted with 0, 1, 2 or 3 substituents independently selected from halogen, hydroxy, amino, cyano, C_1-C_4alkyl, C_1-C_4alkoxy, mono- or di-C_1-C_4alkylamino, C_2-C_4alkanoyl, (C_3-C_7cycloalkyl)C_0-C_2alkyl, C_1-C_2haloalkyl and C_1-C_2haloalkoxy.

4. A compound or salt according to claim 1 or claim 2, wherein Ar represents phenyl, pyridyl, thiazolyl, thienyl, pyridazinyl or pyrimidinyl, each of which is substituted with from 0 to 4 substituents.

5. A compound or salt according to claim 4, wherein Ar represents phenyl, pyridyl, thiazolyl, thienyl or pyridazinyl, each of which is substituted with from 0 to 3 substituents independently selected from chloro, fluoro, hydroxy, cyano, amino, C_1-C_4alkyl, C_1-C_4alkoxy, C_1-C_2alkylamino, C_1-C_2haloalkyl and C_1-C_2haloalkoxy.

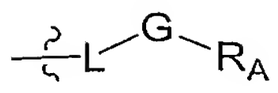
6. A compound or salt according to claim 5, wherein Ar represents phenyl, 2-pyridyl, 1,3-thiazol-2-yl, 2-thienyl or pyridazin-3-yl, each of which is substituted with from 0 to 3 substituents independently selected from fluoro, chloro, hydroxy, C_1-C_2alkyl, cyano and C_1-C_2alkoxy.

7. A compound or salt according to claim 5, wherein Ar represents 2,6-difluoro-phenyl, 2,5-difluoro-phenyl, 5-fluoro-2-methyl-phenyl, pyridine-2-yl, 3-fluoro-pyridin-2-yl, 3-cyano-pyridin-2yl, 3-trifluoromethyl-pyridin-2-yl, 3-hydroxy-pyridin-2-yl, 3-methoxy-pyridin-2-yl, 6-fluoro-pyridin-2-yl, 6-cyano-pyridin-2-yl, 6-trifluoromethyl-pyridin-2-yl, 6-hydroxy-pyridin-2-yl or 6-methoxy-pyridin-2-yl.

8. A compound or salt according to any one of claims 1-7, wherein R_1, R_2, R_3 and R_4 are independently selected from:

(a) hydrogen, halogen or cyano; and

(b) groups of the formula:



wherein:

(i) L is a single covalent bond;

(ii) G is a single covalent bond, -NH-, -N(R_B)-, -O-, -C(=O)O- or C(=O)-; and

(iii) R_A and R_B are independently selected from (1) hydrogen and (2) C_1-C_6alkyl, C_2-C_6alkenyl, (C_3-C_7cycloalkyl)C_0-C_2alkyl, phenyl, thienyl, pyridyl, pyrimidinyl, thiazolyl and pyrazinyl, each of which is substituted with from 0 to 4 substituents independently selected from hydroxy, halogen, cyano, amino, C_1-C_2alkyl and C_1-C_2alkoxy.

9. A compound or salt according to claim 8 wherein R_1, R_2, R_3 and R_4 are independently selected from hydrogen, hydroxy, halogen, cyano, aminocarbonyl, C_1-C_6alkyl, C_1-C_6alkoxy, C_2-C_6alkyl ether, C_3-C_7cycloalkyl, C_1-C_4hydroxyalkyl, C_1-C_2haloalkyl, C_1-C_2haloalkoxy, C_1-C_6alkoxycarbonyl, mono- and di-(C_1-C_4alkyl)amino, phenyl and pyridyl.

10. A compound or salt according to claim 9, wherein R_3 and R_4 are independently selected from hydrogen, methyl and ethyl.

11. A compound or salt according to any one of claims 1-10, wherein Z_1 is nitrogen and Z_2 is CR_2.

12. A compound or salt according to claim 11, wherein R_2 is selected from hydrogen, cyano, aminocarbonyl, C_1-C_4alkyl, C_1-C_4alkoxy, C_1-C_4alkoxycarbonyl, C_2-C_4alkyl ether, C_3-C_7cycloalkyl, C_1-C_2hydroxyalkyl, fluoromethyl, difluoromethyl, trifluoromethyl, phenyl and pyridyl.

13. A compound or salt according to any one of claims 1-10, wherein Z_1 is CR_1 and Z_2 is nitrogen.

14. A compound or salt according to claim 13, wherein R_1 is selected from hydrogen, cyano, aminocarbonyl, C_1-C_4alkyl, C_1-C_4alkoxy, C_1-C_4alkoxycarbonyl, C_2-C_4alkyl ether, C_3-C_7cycloalkyl, C_1-C_2hydroxyalkyl, fluoromethyl, difluoromethyl, trifluoromethyl, phenyl and pyridyl.

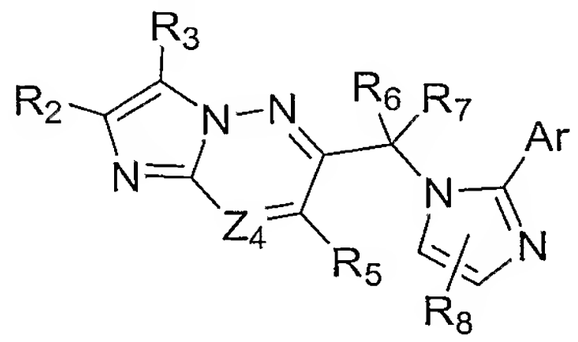
15. A compound or salt according to any one of claims 1-10, wherein Z_1 and Z_2 are nitrogen.

16. A compound or salt according to any one of claims 1-15, wherein R_6 and R_7 are both hydrogen.

17. A compound or salt according to any one of claims 1-16, wherein R_5 is C_1-C_6alkyl, C_2-C_6 alkenyl, C_1-C_4 alkoxy, or mono- or di-C_1-C_4alkylamino, each of which is substituted with from 0 to 2 substituents independently selected from halogen, hydroxy, C_1-C_2alkoxy, C_3-C_8cycloalkyl, phenyl and phenylC_1-C_2alkoxy.

18. A compound or salt according to claim 17, wherein R_5 is ethyl, propyl, butyl, ethoxy or methoxymethyl.

19. A compound or salt according to claim 1, wherein the compound has the formula:



wherein:

R_2 is selected from hydrogen, hydroxy, halogen, cyano, aminocarbonyl, C_1-C_6alkyl, C_1-C_6alkoxy, C_3-C_7cycloalkyl, C_2-C_6alkyl ether, C_1-C_4hydroxyalkyl, C_1-C_2haloalkyl, C_1-C_2haloalkoxy, C_1-C_4alkoxycarbonyl, mono- and di-(C_1-C_4alkyl)amino, phenyl and pyridyl;

R_3 and R_4, if present, are independently hydrogen or C_1-C_4alkyl;

R_5 is C_1-C_6alkyl, C_2-C_6alkenyl, C_1-C_4alkoxy, or mono- or di-C_1-C_4alkylamino, each of which is substituted with from 0 to 2 substituents independently selected from halogen, hydroxy, C_1-C_2alkoxy, C_3-C_8cycloalkyl, phenyl and phenylC_1-C_2alkoxy;

R_6 and R_7 are independently hydrogen, methyl, ethyl or halogen;

R_8 represents 0 or 1 substituent selected from halogen, C_1-C_2alkyl and C_1-C_2alkoxy; and

Ar represents phenyl, 2-pyridyl, 1,3-thiazol-2-yl, 2-thienyl or 3-pyridazinyl, each of which is substituted with from 0 to 3 substituents independently selected from fluoro, chloro, hydroxy, C_1-C_2alkyl, C_1-C_2haloalkyl, cyano and C_1-C_2alkoxy.

20. A compound or salt according to claim 19, wherein:

R_2 is hydrogen, cyano, aminocarbonyl, C_1-C_6alkyl, C_1-C_6alkoxy, C_3-C_6cycloalkyl, C_2-C_6alkyl ether, C_1-C_4hydroxyalkyl, C_1-C_2haloalkyl or C_1-C_4alkoxycarbonyl;

Z_4 is CR_4;

R_3 and R_4 are independently hydrogen or C_1-C_2alkyl;

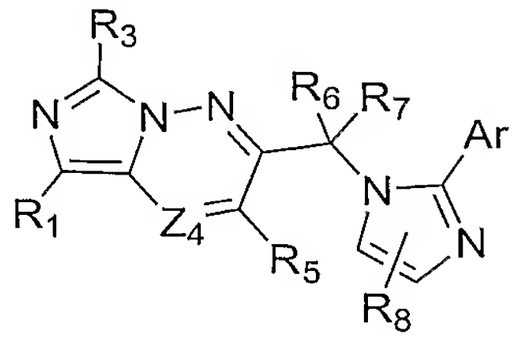
R_5 is C_1-C_6alkyl or C_2-C_6alkenyl, each of which is substituted with from 0 to 2 substituents independently selected from halogen, hydroxy and C_1-C_2alkoxy;

R_6 and R_7 are hydrogen;

R_8 represents 0 substituents; and

Ar represents phenyl or 2-pyridyl, each of which is substituted with from 0 to 3 substituents independently selected from fluoro, chloro, C_1-C_2alkyl, C_1-C_2haloalkyl, cyano and C_1-C_2alkoxy.

21. A compound or salt according to claim 1, wherein the compound has the formula:



wherein:

R_1 is selected from hydrogen, hydroxy, halogen, cyano, aminocarbonyl, C_1-C_6alkyl, C_1-C_6alkoxy, C_3-C_7cycloalkyl, C_2-C_6alkyl ether, C_1-C_4hydroxyalkyl, C_1-C_2haloalkyl, C_1-C_2haloalkoxy, C_1-C_4alkoxycarbonyl, mono- and di-(C_1-C_4alkyl)amino, phenyl and pyridyl;

R_3 and R_4, if present, are independently hydrogen or C_1-C_4alkyl;

R_5 is C_1-C_6 alkyl, C_2-C_6 alkenyl, C_1-C_4 alkoxy, or mono- or di-C_1-C_4alkylamino, each of which is substituted with from 0 to 2 substituents independently selected from halogen, hydroxy, C_1-C_2alkoxy, C_3-C_8cycloalkyl, phenyl and phenylC_1-C_2alkoxy;

R_6 and R_7 are independently hydrogen, methyl, ethyl or halogen;

R_8 represents 0 or 1 substituent selected from halogen, C_1-C_2alkyl and C_1-C_2alkoxy; and

Ar represents phenyl, 2-pyridyl, 1,3-thiazol-2-yl, 2-thienyl or 3-pyridazinyl, each of which is substituted with from 0 to 3 substituents independently selected from fluoro, chloro, hydroxy, C_1-C_2alkyl, C_1-C_2haloalkyl, cyano and C_1-C_2alkoxy.

22. A compound or salt according to claim 21, wherein:

R_1 is hydrogen, cyano, aminocarbonyl, C_1-C_6alkyl, C_1-C_6alkoxy, C_3-C_6cycloalkyl, C_2-C_6alkyl ether, C_1-C_4hydroxyalkyl, C_1-C_2haloalkyl or C_1-C_4alkoxycarbonyl;

Z_4 is CR_4;

R_3 and R_4 are independently hydrogen or C_1-C_2alkyl;

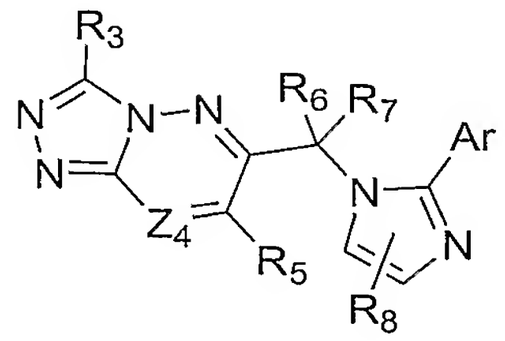
R_5 is C_1-C_6alkyl or C_2-C_6alkenyl, each of which is substituted with from 0 to 2 substituents independently selected from halogen, hydroxy and C_1-C_2alkoxy;

R_6 and R_7 are hydrogen;

R_8 represents 0 substituents; and

Ar represents phenyl or 2-pyridyl, each of which is substituted with from 0 to 3 substituents independently selected from fluoro, chloro, C_1-C_2alkyl, C_1-C_2haloalkyl, cyano and C_1-C_2alkoxy.

23. A compound or salt according to claim 1, wherein the compound has the formula:



wherein:

R_3 and R_4, if present, are independently hydrogen or C_1-C_4alkyl;

R_5 is C_1-C_6 alkyl, C_2-C_6 alkenyl, C_1-C_4 alkoxy, or mono- or di-C_1-C_4alkylamino, each of which is substituted with from 0 to 2 substituents independently selected from halogen, hydroxy, C_1-C_2alkoxy, C_3-C_8cycloalkyl, phenyl and phenylC_1-C_2alkoxy;

R_6 and R_7 are independently hydrogen, methyl, ethyl or halogen;

R_8 represents 0 or 1 substituent selected from halogen, C_1-C_2alkyl and C_1-C_2alkoxy; and

Ar represents phenyl, 2-pyridyl, 1,3-thiazol-2-yl, 2-thienyl or 3-pyridazinyl, each of which is substituted with from 0 to 3 substituents independently selected from fluoro, chloro, hydroxy, C_1-C_2alkyl, C_1-C_2haloalkyl, cyano and C_1-C_2alkoxy.

24. A compound or salt according to claim 23, wherein:

Z_4 is CR_4;

R_3 and R_4 are independently hydrogen or C_1-C_2alkyl;

R_5 is C_1-C_6alkyl or C_2-C_6alkenyl, each of which is substituted with from 0 to 2 substituents independently selected from halogen, hydroxy and C_1-C_2alkoxy;

R_6 and R_7 are hydrogen;

R_8 represents 0 substituents; and

Ar represents phenyl or 2-pyridyl, each of which is substituted with from 0 to 3 substituents independently selected from fluoro, chloro, C_1-C_2alkyl, C_1-C_2haloalkyl, cyano and C_1-C_2alkoxy.

25. A compound or salt according to any one of claims 1-24, wherein the compound exhibits a K_i of 1 micromolar or less in an assay of $GABA_A$ receptor binding.

26. A compound or salt according to claim 25, wherein the compound exhibits a K_i of 100 nanomolar or less in an assay of $GABA_A$ receptor binding.

27. A compound or salt according to claim 26, wherein the compound exhibits a K_i of 10 nanomolar or less in an assay of $GABA_A$ receptor binding.

28. A pharmaceutical composition comprising a compound or salt according to any one of claims 1-24 in combination with a physiologically acceptable carrier or excipient.

29. A pharmaceutical composition according to claim 28, wherein the pharmaceutical composition is formulated as an injectible fluid, an aerosol, a cream, a gel, a pill, a capsule, a syrup or a transdermal patch.

30. A method for the treatment of anxiety, depression, a sleep disorder, attention deficit disorder or Alzheimer's dementia, comprising administering to a patient in need of such treatment a therapeutically effective amount of a compound or salt according to any one of claims 1-24.

31. A method for potentiating a therapeutic effect of a CNS agent, comprising administering to a patient a CNS agent and a compound or salt according to any one of claims 1-24.

32. A method for improving short term memory in a patient, comprising administering to a patient a therapeutically effective amount of a compound or salt according to any one of claims 1-24.

33. A method for altering the signal-transducing activity of $GABA_A$ receptor, comprising contacting a cell expressing $GABA_A$ receptor with a compound or salt according any one of claims 1-24 in an amount sufficient to detectably alter the electrophysiology of the cell, and thereby altering $GABA_A$ receptor signal-transducing activity.

34. A method according to claim 33, wherein the cell recombinantly expresses a heterologous $GABA_A$ receptor, and wherein the alteration of the electrophysiology of the cell is detected by intracellular recording or patch clamp recording.

35. A method for determining the presence or absence of $GABA_A$ receptor in a sample, comprising the steps of:

(a) contacting a sample with a compound or salt according claim 1, under conditions that permit binding of the compound to $GABA_A$ receptor;

(b) removing the compound or salt that is not bound to $GABA_A$ receptor; and

(c) detecting a level of the compound or salt bound to $GABA_A$ receptor;

and therefrom determining the presence or absence of $GABA_A$ receptor in the sample.

36. A method according to claim 35, wherein the presence or absence of bound compound is detected using autoradiography.

37. A method for determining the presence or absence of $GABA_A$ receptor in a sample, comprising:

determining background binding by, in order:

(a) contacting a first sample with a measured molar concentration of a labeled compound that is known not to bind to $GABA_A$ receptors, under conditions that permit binding of compounds to $GABA_A$ receptors;

(b) washing the first sample under conditions that permit removal of compounds that are not bound to $GABA_A$ receptors; and

(c) detecting as a background binding amount an amount of label remaining after washing;

and

determining $GABA_A$ binding by, in order:

(d) contacting with a labeled compound or salt according to claim 1 a second sample matched to the first sample, said compound or salt being present at the measured molar concentration of (a) and said contacting being carried out under the conditions used in (a);

(e) washing the second sample under the conditions used in (b),

(f) detecting an amount of label remaining in the second sample after washing; and

(g) subtracting the background binding amount determined in (c) from the amount of label remaining in the second sample determined in (f)

wherein the remainder of a positive amount after the subtraction of (g) indicates the presence of $GABA_A$ receptor in the second sample.

38. A method according to claim 37, wherein the amount of label remaining after washing of the first sample and the second sample is detected using autoradiography.

39. A packaged pharmaceutical preparation comprising a pharmaceutical composition according to claim 28 in a container and instructions for using the composition to treat a patient suffering from anxiety, depression, a sleep disorder, attention deficit disorder, Alzheimer's dementia or short-term memory loss.

40. The use of a compound or salt according to claim 1 for the manufacture of a medicament for the treatment of a condition selected from anxiety, depression, a sleep disorder, an attention deficit disorder, Alzheimer's dementia and short-term memory loss.

41. 6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-imidazo[1,2-b]pyridazine or a pharmaceutically acceptable salt thereof.

42. 2-tert-butyl-6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-imidazo[1,2-b]pyridazine or a pharmaceutically acceptable salt thereof.

43. 2-ethyl-6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-imidazo[1,2-b]pyridazine or a pharmaceutically acceptable salt thereof.

44. 2-methyl-6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-imidazo[1,2-b]pyridazine or a pharmaceutically acceptable salt thereof.

45. 6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-2trifluoromethyl-imidazo[1,2-b]pyridazine or a pharmaceutically acceptable salt thereof.

46. 6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-imidazo[1,2-b]pyridazine-2-carboxylic acid ethyl ester or a pharmaceutically acceptable salt thereof.

47. 6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-imidazo[1,2-b]pyridazine-2-carboxylic acid amide or a pharmaceutically acceptable salt thereof.

48. 6-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-7-propyl-imidazo[1,2-b]pyridazine-2-carbonitrile or a pharmaceutically acceptable salt thereof.

49. 6-[2-(6-Fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-8-methyl-7-propyl-imidazo[1,2-b]pyridazine or a pharmaceutically acceptable salt thereof.

50. 2-[2-(6-fluoro-pyridin-2-yl)-imidazol-1-ylmethyl]-5-methyl-3-propyl-imidazo[1,5-b]pyridazine or a pharmaceutically acceptable salt thereof.

51. 7-ethyl-6-[2-(3-fluoro-phenyl)-imidazol-1-ylmethyl]-[1,2,4]triazolo[4,3-b] pyridazine or a pharmaceutically acceptable salt thereof.

52. 7-ethyl-6-[2-(3-fluoro-phenyl)-imidazol-1-ylmethyl]-3-methyl-[1,2,4]triazolo [4,3-b] pyridazine or a pharmaceutically acceptable salt thereof.